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APPLE DISEASES AND THEIR TREATMENT.

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Increasing interest in apple culture in Maryland will necessitate more attention to rots, scab, blight and other diseases, which have been already serious in some localities. Most of the apple diseases are easily prevented and treatment for them has been so long and extensively practiced that its success and profitability is thoroughly demonstrated. The following pages give a short account of the principal diseases of the apple, which may be troublesome in Maryland, with the treatment to be used for them. On page 5 is given a scheme for the general treatment of the apple orchard with reference to fungous diseases. This would need modification for local conditions, and would not be expected to fit conditions in every orchard, but still could be followed as a general guide.

CROWN GALL.

This disease is indicated by rough swellings about the junction of stem and root (See figure I.) or sometimes lower on the root, and usually associated with an unusual number of small roots. This is more troublesome in the nursery than in the orchard, but galled trees should not be planted as they often make a slow growth or soon die.

ROOT ROT.

Slow growth with scanty and yellow foliage usually indicates some root trouble, and is often caused by fungi attacking and killing the roots. Such trees as a rule should be dug up and burned. These diseases are more apt to affect trees of low vitality, from lack of culture, poor soil, drouth or very wet ground. Good care will prevent a great deal of wood rot both above and below ground.

CANKER AND BODY BLIGHT.

The dead areas in the bark of trunk and branches known under these names are mostly caused by the same fungus that causes the black rot of the fruit. Cankers may also be formed by the bitter rot and other fungi. They spread most rapidly in the early part of the

season and may occur where the tree is injured by drouth or heat. The diseased portion often extends around the tree or branch, and, if deep enough to reach the wood, may girdle and kill it. The cankers or diseased bark should be scraped out down to live tissue, and painted over with something to protect it until healed over, and also to prevent further growth of the fungus. The following mixtures have been recommended: whale oil soap, 1 pint; slacked lime, 3 pints; water, 4 gallons; wood ashes, to thicken as desired; or formalin, 1 pint; glycerine, 2 pints; water 17 pints. The rotten fruit should be picked and burned, and Bordeaux mixture sprayed on the trunks and branches as preventive measures. The treatment given also applies to pears in which the disease is more destructive.

WOOD DECAY.

Especially where trees are in poor condition, various fungi which live on dead wood may also attack the live wood of fruit trees. These



Figure I.—Crown gall on apple at left, on peach at right.

almost always enter through dead limbs or stubs left in pruning. All dead wood should be burned, and exposed wood surfaces painted over. The shelf-like, mushroom outgrowths, which appear on dead branches, may be the fruiting organs of these fungi and should be destroyed.

FIRE BLIGHT.

The blight usually begins in the flower, where the germs of the disease are often deposited by bees, and works down between wood and bark in the twigs. When this portion is dead, and the water supply cut off, the leaves die, turn dark and hang on the dead branches, giving a scorched appearance. The best treatment is to cut off and

burn the blighted twigs or branches, making the cut three to six inches below the line of blight, and dipping the pruning knife frequently in dilute carbolic acid to prevent accidental infection from it. This pruning can be done a few weeks after blossoming time, when most of the blight has appeared, and again just after the leaves fall in autumn, when the blighted leaves remaining on the tree, will indicate any cases overlooked. This destroys the source of infection for another year, and prevents further extension down the blighted branches. Where only a few twigs are blighted, they should be removed the more carefully since they may furnish the starting point for a serious outbreak another season. The blight often spreads slowly as it is carried by bees and where isolated cases occur, their destruction may prevent a general outbreak.

RUST.

Rust causes yellow spots, on the apple leaves, which are raised and roughened on the under side showing clusters of minute fringed cups. The spores produced in these cups infect the red cedar causing the cedar apples, which in turn form spores that produce the rust in apple and related trees. The presence of cedar trees, near or in an orchard, is almost always associated with outbreaks of the apple leaf rust. When cedar trees thus become a menace to apple orchards, they



Figure II.—The apple on the left cracked from effect of scab; on the right common effect of scab on apples.

should be destroyed. Spraying with the Bordeaux mixture is some benefit. The rust sometimes may become established in the twigs and then it is difficult to get rid of. It may also occur on the fruit. Some varieties are affected worse than others.

LEAF SPOT.

Apple leaves are often covered with small, roundish, brown spots which may become so abundant as to destroy the foliage, and, if they do not injure the fruit crop that year, so weaken the tree, that it will be much less productive in the future. Most of these leaf diseases can be prevented by two or three sprayings with Bordeaux mixture per year. The scab fungus also may attack the leaves.

SCAB.

Scab causes rough, dark-colored spots on the fruit. The diseased portions of the fruit do not grow well and may crack, rendering the ap-



Figure III.—Apples affected with bitter rot. (After Stinson.)

ple worthless, and at least unsightly and unmarketable, and may give entrance to more destructive rot fungi. This is one of the worst apple diseases, but it is very easily prevented by one or more sprayings with Bordeaux mixture applied early in the season, the first and most important just before the blossoms open. (See figure II.)

BLACK ROT.

This disease appears as discolored spots on the more mature fruit, which may spread until most of the fruit is covered, and later turns black, the flesh underneath is brown and streaked and dryer. It is caused by the same fungus which causes the cankers before mentioned. The fungus may live over winter in the decayed fruits. These should be all destroyed, the cankers treated, and spraying practiced. Most of the apple rot is caused by the more serious bitter rot.

BITTER ROT.

The bitter rot fungus may form cankers on branches, from which it may spread to the fruit in spring and summer. The rot starts as small, slightly-sunken spots on the fruit, (See figure III.) which may grow rapidly larger and deeper until the whole fruit is destroyed. The spots soon form spores which may infect other fruits, or start new spots on the same. The rot may thus spread rapidly during summer, and even after the fruit is stored, but spreads comparatively slowly from tree to tree. No affected fruits should be left in the orchard, the cankers should be cut out, and no apples with indications of rot should be stored with sound ones. Several sprayings are necessary to keep down the bitter rot, the first to be given in early spring before the buds swell. This disease is more troublesome in the south, but seriously affects a number of orchards in Maryland.

Some less important diseases of apple are fly-speck fungus, which causes the small dots on apples; brown rot of the fruit; brown fungus spots in the flesh of the fruit; watery spots in the flesh; leaf mildew, etc. Serious injury may also result from poor horticultural practices, which do not trouble the good horticulturist, or from weather and soil conditions, which cannot be controlled.

GENERAL TREATMENT FOR DISEASES.

During winter or very early spring all dead branches and remains of fruit should be collected and burned. Blighted twigs should be cut out and all cankers treated. Where large branches are pruned out, the exposed surface left should be covered with coal-tar or some other paint which will exclude moisture. If the orchard is not badly troubled with leaf and fruit diseases, one spraying with Bordeaux mixture may be sufficient, and should be given just after the petals of the flowers fall. (See figure IV.) At this time, Paris green should be added at the rate of one third pound to fifty gallons of Bordeaux mixture for codling moth. For information on the preparation and use of Bordeaux mixture see Circular Bulletins 40 and 50. A week or two after this spraying, the orchard should be examined for blight, which should be cut out and for cankers or sun scald on the trunk and branches. If rot is bad in the orchard, two to five sprayings in addition, during the summer, may

be necessary, to keep it in check. One of these should be given before the buds open. This spraying is also necessary, if scab is bad. If close watch is kept, the beginning of diseases can be seen long before they become dangerous and measures of control can be taken. In picking the fruit, the rotten apples should be gathered and



Figure IV.—The young apples at the left are the proper age for spraying; those on the right are too old. (After Quaintance.)

burned, or they may be fed to hogs. In the fall, dead branches, especially those on which hanging dead leaves indicate blight, fallen leaves, etc., should be collected and burned. At any time when trees become unproductive from crown gall, root rot or wood rot, they had better be dug up and replaced by more vigorous ones.



